

**REMARKS**

These Amendments and Remarks are being filed in response to the Office Action dated February 7, 2002. For the following reasons, this Application should be in condition for allowance and the case passed to issue.

No new matter is introduced by this amendment. The amendment to the specification is supported by originally filed claim 5. New claim 6 is supported by claims 1 and 2 as originally filed.

***Abstract Of The Disclosure***

The Abstract of the Disclosure was objected to because lines 1 and 2 allegedly draw reference to the purported merits of the claimed invention.

In response to this objection, a new Abstract of the Disclosure is attached on a separate sheet.

***Drawings***

The drawings were objected to under 37 CFR § 1.83(a) because they do not show the high heat conductor film that is united with one of the terminal wirings, as required in claim 5.

In response to this objection, a new figure is submitted, Fig. 6, showing the high heat conductor layer 6 united with one of the terminal wirings, 4A.

***Claim Rejections Under 35 USC § 102***

Claim 1 was rejected under 35 USC § 102(b) as being anticipated by Yasushi et al. (JP No. 05,232,516). This rejection is moot, as claim 1 has been canceled.

***Claim Rejections Under 35 USC § 103***

Claims 2-5 were rejected under 35 USC § 103(a) as being unpatentable over Yasushi et al. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison of the instant invention and the cited prior art.

An aspect of the invention, per claim 2, is a semiconductor device comprising a semiconductor substrate and a first insulating film formed on the semiconductor substrate. A polysilicon resistor film is formed on the first insulating film. A second insulating film is formed on the resistor film. A high heat conductor film consisting of a highly heat-conducting material is formed on a second insulating film. A pair of terminal wirings are formed on the second insulating film and connected to the resistor film. The thickness of the high conductor film is thicker than a thickness of the resistor film.

The Examiner asserted that Yasushi et al. teach the claimed semiconductor device except for the thickness of the second insulating film being thicker than the thickness of the resistor film. The Examiner, however, asserted that it would have been obvious to have made a second insulating film thicker than the resistor film as a matter of design choice.

Obviousness can be established only by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). The mere fact that references can be combined or modified does not render the resultant combination

obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

Yasushi et al. do not suggest a semiconductor device as claimed wherein a thickness of the high heat conductor film is thicker than a thickness of the resistor film. Yasushi et al. do not suggest the criticality of forming the high heat conductor film thicker than a thickness of the resistor film. As explained on page 7 of the specification and Figures 3 and 4, the relative thickness of the high heat conductor film and resistor film is critical. When the high heat conductor film is thicker than the resistor film, electrostatic discharge breakdown is prevented. Yasushi et al. do not suggest this critical feature when the thickness of the high heat conductor film is thicker than a thickness of the resistor film. Because of at least the criticality of the relative thicknesses of the high heat conductor film and the resistor film, selecting the high heat conductor film to be thicker than a thickness of the resistor film is not a matter of design choice. Therefore, claim 2 is not obvious in view of Yasushi et al.

The dependent claims further distinguish the claimed invention over Yasushi et al. Claim 3 for example, requires that the thickness of the high heat conductor film is twice the thickness of the resistor film or thicker. Claim 4, requires that the width of the high heat conductor film is wider than a width of the resistor film and claim 5 requires that the high heat conductor film is united with one of the terminal wirings.

The Examiner considered the requirement that the high heat conductor film is twice the thickness of the resistor film or thicker be a matter of design choice. The Examiner furthermore, concluded it would have been obvious that the size of the heat sink determines the degree of heat transfer from the desired area, thus it would have been obvious to alter the size of the heat sink according to the desired amount of heat dissipation.

Claim 3, however, is not obvious. The prior art must suggest the desirability of the modification, whereas there is no suggestion in Yasushi et al. to provide a high heat conductor film that is twice the thickness of the resistor film or thicker. Furthermore, as explained above, Yasushi et al. do not suggest the criticality of using a high heat conductor film that is thicker than the resistor film.

As regards claim 4, the Examiner asserted that Yasushi et al. teach a high heat conductor film that is wider than the width of the resistor film. Claim 4, however, is not obvious for at least the same reasons as independent claim 2.

As regards claim 5, the Examiner concluded that it would have been obvious to connect one of the terminal wires to the heat sink to improve thermal conductivity.

Claim 5 is allowable for at least the same reasons as claim 2. Furthermore, there is no suggestion in Yasushi et al. to provide a high heat conductor film that is united with one of the terminal wirings in order to improve thermal conductivity, as asserted by the Examiner.

New claim 6 is allowable over the cited prior art. New claim 6 requires that the thickness of a second insulating film is thinner than a thickness of the resistor film and a thickness of the high heat conductor film is thicker than a thickness of the resistor film. If a thickness of the second insulating film is thicker than a thickness of the resistor film and a thickness of the high heat conductor film is thinner than a thickness of the resistor film, the temperature rises rapidly (see Fig 4, curve b and page 6, line 23 to page 8 line 15) causing permanent thermal breakdown and low resistance to electrical power surges. On the other hand, if a thickness of the second insulating film is thinner than a thickness of the resistor film and a thickness of the high heat conductor film is thicker than a thickness of the resistor

film, the peak temperature is significantly reduced (see Fig 4, curve c, d, e) and permanent thermal breakdown does not occur.

The condition that a thickness of the second insulating film is thinner than a thickness of the resistor film, and the thickness of the high heat conductor film is thicker than a thickness of the resistor film is critical and is not suggested by the prior art. Applicant discovered this characteristic by temperature rise and ESD simulations. Yasuchi et al. (JP 9-232516) does not disclose or suggest this characteristic. Therefore, it would not have been obvious to one of ordinary skill in the art.

In light of the Amendments and Remarks above, this application should be considered in condition for allowance. If there are any question regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Attached hereto is a marked-up version of the changes made to the specification and

claims by the current amendment. The attached is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

MCDERMOTT, WILL & EMERY



Bernard P. Codd  
Registration No. 46,429

600 13<sup>th</sup> Street, N.W.  
Washington, DC 20005-3096  
(202)756-8000 BPC:rrh  
Facsimile: (202)756-8087  
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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION:**

The paragraph beginning at line 19, page 4, has been added as follows:

FIG. 6 is a sectional view showing a high heat conductor layer united with a terminal wiring.

The paragraph beginning at line 4, page 9, has been amended as follows:

Also, when the high heat conductor layer 6 is used in common with terminal wiring 4A and 4B made of A1 or the like, since the area of the high heat conductor layer 6 can be increased by using the high heat conductor layer 6 as a part of the ground/power wiring region or input/output pads, the resistance to surge power of not only an extremely short time such as ESD, but also a relatively long time of the millisecond order, can be improved.

FIG. 6 illustrates the high heat conductor layer 6 united with one of the terminal wirings 4A.

A new Abstract of the Disclosure has been submitted.

**IN THE CLAIMS:**

Claim 1 has been canceled.

New claim 6 has been added.